Sim Chong Yang

Doctor of Philosophy

2020

Interest Rate Volatility and Asymmetric Interest Rate Pass-through in Selected SAARC Countries

Sim Chong Yang

Faculty of Economics and Business
Universiti Malaysia Sarawak
2020

Interest Rate Volatility and Asymmetric Interest Rate Pass-through in Selected SAARC Countries

Sim Chong Yang

A thesis submitted

In fulfillment of the requirements for the degree of Doctor of Philosophy

(Financial Economics)

Faculty of Economics and Business
UNIVERSITI MALAYSIA SARAWAK
2020

DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Malaysia Sarawak. Except where due acknowledgements have been made, the work is that of the author alone. The thesis has not been accepted for any degree and is not concurrently submitted in candidature of any other degree.

……

Signature

Name: Sim Chong Yang

Matric No.: 14010120

Faculty of Economics and Business

Universiti Malaysia Sarawak

Date:

ACKNOWLEDGEMENT

Firstly, I would like to humbly express my deepest gratitude and sincere appreciation to my supervisory committee, Professor Dato' Dr. Shazali bin Abu Mansor and Associate Professor Dr. Puah Chin Hong for their exceptional guidance, supports and advices that have made this journey possible. They have provided me with a wealth of valuable scholarly advices and suggestions which had significantly improved the quality of this thesis.

Secondly, I would like to extend my thankfulness to my university, Universiti Malaysia Sarawak, and to my faculty, the Faculty of Economics and Business for their continuous support and tremendous assistance towards the completion of this thesis.

Thirdly, I would like to express my fullest gratefulness to my parents for their exceptional supports and encouragements throughout the completion of this thesis. This PhD journey would not have been possible without their continuous and undivided moral and financial supports as well as companionships.

Finally, I would like to take this opportunity to express my appreciation to my friends for their supports during my study in UNIMAS. I would like to dedicate my thankfulness to my seniors Dr. Maggie Tang May Jean and Mr. Thien Fung Thai for their valuable academic advices. A special thanks is also given to Dr. Kuek Tai Hock and Dr. Ting Mee Sing for their companionship throughout my PhD journey.

ABSTRACT

The outbreak of the Global Financial Crisis in 2008 witnessed the success of monetary policy in stabilising the economy. Central banks have been actively using different monetary policy strategies to achieve and maintain desirable economic goals, such as low unemployment levels, stable general price levels etc. Central banks usually convey monetary policy decisions by firstly adjusting policy rates that subsequently passed-through to bank retail rates, in which the latter process is known as interest rate pass-through, before the monetary policy decisions are finally channelled to the economy through various monetary policy transmission channels. Previous literature has also discovered that interest rate volatility influences bank retail rate adjustment behaviour, while changes in the monetary stance also affect the bank retail rate volatility. Therefore, this study intends to examine the pass-through mechanism in four major SAARC countries, namely; Pakistan, India, Bangladesh and Sri Lanka. This study used the Threshold Autoregressive and Momentum Threshold Autoregressive models of Enders and Siklos (2001) and the Error Correction Exponential Generalised Autoregressive Conditional Heteroscedasticity in Mean (EC-EGARCH-M) model proposed by Wang and Lee (2009). Based on the empirical results, the first stage of the interest rate pass-through mechanism is complete in Pakistan, India and Sri Lanka only. While, the second stage of the interest rate pass-through mechanism is incomplete for both the deposit rate and lending rate models of all of the sample countries, except for the lending rate model of Sri Lanka. The money market rates and bank retail rates of all of the sample countries are found to have asymmetric long-run relationships, except for the lending rate of India. It has also been discovered that the asymmetric short-run adjustment between the money market rates and bank retail rates of Pakistan and Sri Lanka and between the money market rates and deposit rate of India supported the adverse customer reaction hypothesis,

while Bangladesh supported the collusive pricing behaviour hypothesis. In terms of the effect of interest rate volatility on the adjustment behaviour of bank retail rates, it is significantly positive for both bank retail rate models of Pakistan and the lending rate model of Bangladesh, while significantly negative for the deposit rate model of Bangladesh. Its effect is insignificant on both retail rate models of India and Sri Lanka. As for the presence of asymmetry in the conditional volatility of both bank retail models, the asymmetry effect is found for the lending rate model of all of the sample countries, while the leverage effect is found on the deposit rate model of Pakistan and Sri Lanka. Generally, this study has managed to achieve its objectives. Various relevant policy recommendations are proposed to the central banks of the sample countries to improve the performance of interest rate pass-through in their countries.

Keywords: Interest rate pass-through, asymmetric adjustments, asymmetric cointegration, bank retail rates, interest rate volatility, leverage effect

Ketidaktentuan Kadar Faedah dan Kesan Pindahan Asimetri Kadar Faedah di Negara-negara SAARC yang Terpilih

ABSTRAK

Krisis Kewangan pada tahun 2008 telah menyaksikan kejayaan dasar kewangan dalam penstabilan ekonomi. Bank-bank pusat telah menggunakan strategi dasar kewangan yang berbeza secara aktif dalam pencapaian dan pengekalan matlamat ekonomi yang diinginkan, contohnya seperti tahap pengangguran yang rendah, paras harga umum yang stabil dan lain-lain. Bank-bank pusat biasanya menyampaikan keputusan dasar kewangan dengan penyesuaian kadar-kadar faedah dasar terlebih dahulu dan kemudiannya dipindahkan kepada kadar-kadar runcit bank, yang mana proses tersebut dikenali sebagai kesan pindahan kadar faedah, sebelum keputusan dasar kewangan tersebut akhirnya disalurkan kepada ekonomi melalui saluran-saluran transmisi dasar kewangan. Hasil kajian terdahulu juga mendapati ketidaktentuan kadar faedah mempengaruhi gelagat penyelarasan kadar-kadar runcit bank, sementara perubahan pendirian kewangan juga mempengaruhi ketidaktentuan kadar-kadar runcit bank. Oleh itu, kajian ini bertujuan untuk mengkaji kesan pindahan kadar faedah di 4 negara SAARC yang utama iaitu Pakistan, India, Bangladesh dan Sri Lanka. Kajian ini menggunakan model-model autoregresif ambang (TAR) dan autoregresif momentum ambang (MTAR) oleh Enders dan Siklos (2001) dan Pembetulan Ralat Heteroskedastisiti Autoregresif Bersyarat Umum Bereksponansi dalam Min oleh Wang dan Lee (2009). Berdasarkan hasil kajian empirikal, mekanisme pindahan kadar faedah pada tahap pertama didapati lengkap untuk Pakistan, India dan Sri Lanka sahaja. Manakala, mekanisme pindahan kadar faedah pada tahap kedua didapati tidak lengkap untuk kedua-dua model, iaitu kadar deposit dan kadar pinjaman untuk semua negara sampel, kecuali model kadar pinjaman Sri Lanka. Kadar pasaran wang dan kadar-kadar

runcit bank untuk semua negara sampel didapati mempunyai hubungan jangka panjang yang asimetri, kecuali kadar pinjaman India. Ia juga telah didapati bahawa penyalarasan jangka pendek yang berasimetri antara kadar pasaran wang dan kadar-kadar runcit bank di Pakistan dan Sri Lanka dan antara kadar pasaran wang dan kadar deposit India menyokong hipotesis gelagat pengguna, manakala Bangladesh menyokong hipotesis gelagat kolusi. Dari segi kesan ketidaktentuan kadar faedah pada pelarasan kadar-kadar runcit bank, ia adalah positif bagi kedua-dua model kadar runcit bank Pakistan dan model kadar pinjaman Bangladesh, manakala negatif bagi model kadar deposit Bangladesh. Kesannya tidak signifikan pada kedua-dua model kadar runcit India dan Sri Lanka. Dari segi kewujudan kesan asimetri dalam ketidaktentuan bersyarat kedua-dua model runcit bank, kesan asimetri didapati wujud dalam model kadar pinjaman untuk semua negara sampel, manakala kesan leveraj pula didapati wujud pada model kadar deposit Pakistan dan Sri Lanka. Secara umumnya, kajian ini telah berjaya mencapai matlamatnya. Cadangan dasar-dasar yang relevan telah diutarakan kepada bank-bank pusat negara-negara tersebut bagi tujuan penambahbaikan mekanisme pindahan kadar faedah di negara mereka.

Kata kunci: *Pengalihan kadar faedah, penyesuaian asimetik, kointegrasi asimetri, kadar runcit bank, volatiliti kadar faedah, kesan leveraj*

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ASEAN	Association of Southeast Asian Nations
BB	Bangladesh Bank
CBSL	Central Bank of Sri Lanka
CRR	Cash reserve ratio
DR	Deposit rate
EC-EGARCH-M	Error correction exponential generalized autoregressive conditional heteroscedasticity in mean
ECM	Error correction model
EMU	European Monetary Union
EU	European Union
FRSP	Financial Sector Reform Program
GDP	Gross domestic product
IMF	International Monetary Fund
LAF	Liquidity adjustment facility
LR	Lending rate
MFI	Ministry of Finance of India
MFP	Ministry of Finance of Pakistan
MTAR	Momentum threshold autoregressive
NSS	National Savings Schemes
OMO	Open market operation
RBI	Reserve Bank of India
SAARC	South Asian Association for Regional Cooperation

SBP	State Bank of Pakistan
SLR	Statutory liquidity ratio
SSS	Small Savings Schemes
TAR	Threshold autoregressive
UK	United Kingdom
VAR	Vector autoregressive

CHAPTER 1

INTRODUCTION

1.1 Introduction

The success of monetary policy as an economic stabilising tool since the outbreak of the global financial crisis has led policymakers to realise its importance in maintaining the well-being of an economy. Since then, monetary policy has been widely accepted as a fundamental tool in macroeconomic management. Monetary policy plays a significant part in an economy in coping with cyclical downturns while spurring economic growth and enhancing price stability (Deger, 2012). Accordingly, central banks have been using monetary policies as viable tools in controlling output, investments, aggregate prices and unemployment levels (Karagiannis, Panagopoulos & Vlamis, 2010). As monetary policy plays a significant role in stabilising the economy, the recent downturns in economies worldwide have put it under a new spotlight (Matemilola, Noordin & Kamarudin, 2018).

Although monetary policy is well-recognised as a powerful tool in today's modern world, with an ever-increasing usage of interest rates as the key instruments of monetary policy, its conduct necessitates a detailed examination on the way in which it is conveyed to the economy in order to prevent any unwanted and unanticipated consequences (Rocha, 2012). The way in which monetary policy decisions are conveyed to the economy is known as the monetary policy transmission mechanism (hereafter "transmission mechanism"). A well-functioning transmission mechanism, represented by the smooth and fast conveyance of monetary policy decisions to the economy, is critical for the effective conduct of monetary policy (Fadiran & Edun, 2013). In fact, this subject has drawn many studies, and they have

mainly concentrated on examining the significance of the transmission mechanism, especially, after the global financial crisis (Yuksel & Ozcan, 2013).

Monetary policy can transmit policy effects into the economy through several, but interconnected, transmission channels, such as the interest rate, the exchange rate, the asset price, the credit and the expectation channels (Mishkin, 2000). Nevertheless, its performance is largely depending on the process whereby banks adjust their retail rates, i.e. deposit and lending rates, following the adjustments in the short-term interest rates (i.e. money market rates and the treasury bill rate) which are controlled by the central bank. This is identified as the interest rate pass-through (hereafter "pass-through"). As the pass-through is the first and foremost building block of the whole transmission mechanism, the ability of monetary policies to achieve their objectives critically hinges on the magnitude of the pass-through, whereby, adjustments in short-term interest rates are conveyed to bank retail rates (Aziakpono, Wilson & Manuel, 2007).

However, studies on the abovementioned subject have generally discovered that the pass-through is usually incomplete in the long-run, while sluggish in the short-run (see, for example, Cottarelli & Kourelis, 1994; Mojon, 2000; Hussain & Nahar, 2016; Liu, Liu & Peng, 2018). Under such circumstances, monetary policy decisions are ineffective because their effects do not perfectly and instantaneously affect the economy, which ultimately renders the desired objectives of such monetary policy decisions unachievable. Furthermore, recent studies have discovered that bank retail rates may adjust asymmetrically to adjustments in short-term interest rates, this may be due to several factors, particularly; banking system structures and competition (see, for example, Payne, 2006; Zulkhibri, 2012; Tang, Liew & Puah, 2015; Matemilola, Bany-Ariffin & Muhtar, 2015).

The presence of these factors greatly impedes the efficiency of the banking system which acts as the key fund's provider in an economy, thus leading to the ineffectiveness of monetary policy decisions made by the central bank. The main reason to study the pass-through is to scrutinise whether monetary policy decisions made by the central bank are effective in achieving the desired economic goals. This is achievable through examining the magnitude of the adjustments in the short-term interest rates that are passed-through to bank's retail rates, as well as to discover factors that cause possible asymmetric adjustments in bank's retail rates toward adjustments in short-term interest rates. Subsequently, this allows for appropriate policy decisions to be made by the central banks based on these identified factors to improve the pass-through.

Despite the significance of the process of pass-through in the transmission mechanism of an economy, empirical studies that have focused on this subject are scant in the South Asian Association for Regional Cooperation (SAARC) countries[1]. This is despite the importance of the process of pass-through on this region, especially for Pakistan, India, Bangladesh and Sri Lanka. These countries have been adopting, or are in a gradual transition[2] from using a monetary targeting framework to using the increasingly popular inflation targeting framework, whereby short-term interest rates are the key instrument in the conduct of monetary policy decisions. In addition, the banking system is the main fund's provider especially in developing countries, such as in the four countries studied, which requires an

[1] Other SAARC countries which are; Afghanistan, Nepal, Bhutan and the Maldives are not included in this study due to a lack of appropriate data.

[2] India transited to the framework in June 2016 (Ministry of Finance of India (MFI), 2015; Mishra, Montiel & Sengupta, 2016), while Pakistan is currently under an inflation targeting lite regime and is transitioning to a full-fledged inflation targeting framework (Arif, 2011). Although Sri Lanka and Bangladesh are still currently under a monetary aggregate targeting framework, there are numerous studies that have proposed the full transition to an inflation targeting framework for Sri Lanka (see, for example, Perera, 2010; Anand, Ding & Peiris, 2011; Perera, 2016) and Bangladesh (Islam & Uddin, 2011; Hossain, 2015).

efficient banking system to allocate funds in the economy with the least distortion (Arora & Ratnasiri, 2014; Gul, Khan & Hassan, 2018). Therefore, all of these reasons justify the importance of a thorough examination of the pass-through process in the aforementioned countries.

Although there are a few relevant studies that have focused on these countries, they do however, have a few noticeable limitations (Andries & Billon, 2016). First, most of them do not account for asymmetric adjustment. Without taking asymmetric adjustments into account, these studies cannot sufficiently address and highlight the main reasons behind the workings of the pass-through process, which relates to, for instance, the banking system structures, information asymmetries, and the behaviour of consumers and firms. This information is vital as it provides clearer policy implications for the central banks of these countries. While some of the studies did account for asymmetric adjustments, the methods that used, however, are rather outdated. Furthermore, and the most important point, these studies do not allow for the effect of interest rate volatility on the bank retail rates adjustment behaviours, while, in fact, its effect has been well-document by previous studies on the pass-through process. As these countries underwent significant reforms and liberalisations over the past decades, interest rate volatility must be examined when scrutinising their pass-through processes. Hence, this study will address the gaps of the aforementioned studies by adopting more advanced methods which incorporate the element of interest rate volatility in examining the studies country's pass-through processes.

1.2 Monetary Policy Transmission Channels

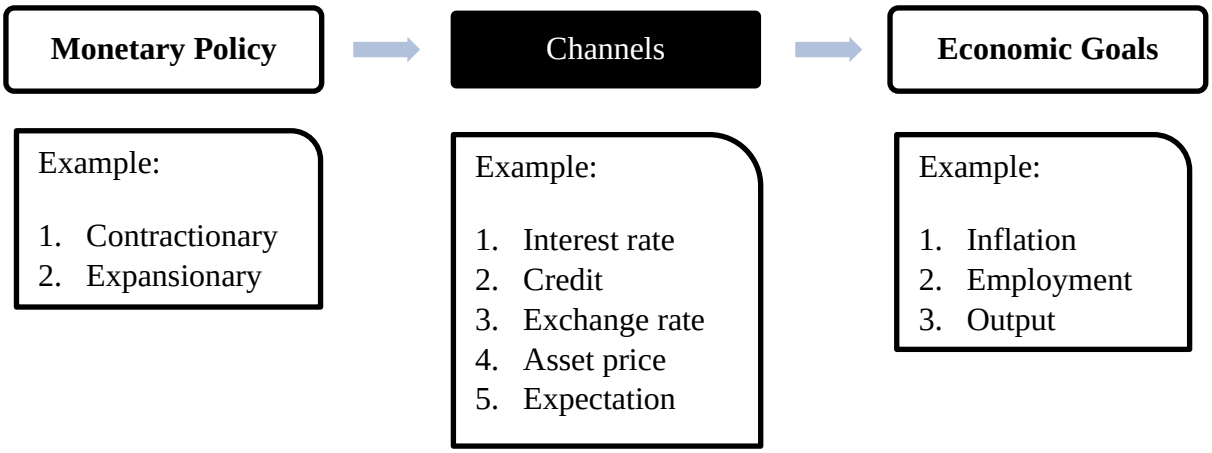

Figure 1.1: The Black Box of Transmission Mechanism
(Source: Song, 2003)

The transmission mechanism is defined as the process whereby monetary policy decisions influences macroeconomic variables through the five transmission channels, as discussed in the previous section. However, the whole mechanism is very complicated and sophisticated in itself, which led Bernanke and Gertler (1995) to coin it as the famous "black box" (see, Figure 1.1), since the precise workings, and the relative importance of these channels in achieving the objectives of monetary policy are rather ambiguous and conflicting.

In general, there is no "best channel" that suits a particular economy. In fact, the channels can work simultaneously to achieve the final economic goals of a country (Khundrakpam & Jain, 2012). The ideal transmission channel of a country may differ across economies due to a number of relevant factors, such as the structural properties of the economy, the stages of banking system development, the availability of monetary policy

instruments, the fiscal stance of the authorities and also the degree of economic openness (Mohan, 2006a).

Although monetary policies are increasingly popular among the economic stabilisation policies used by central banks, however, they sometimes may cause unwanted or unexpected consequences which may ultimately causes adverse effects on the real economy. Thus, the central banks must have a proper evaluation of the timings and consequences of their monetary policy decisions in order to achieve the successful conduct of monetary policies (Mishkin, 1995). Since the effect of monetary policy decisions may be passed-through to the economy in a number of channels, the central banks are required to have a thorough understanding of the workings of monetary policy through each channel and their possible effect on the economy (see, Figure 1.2).

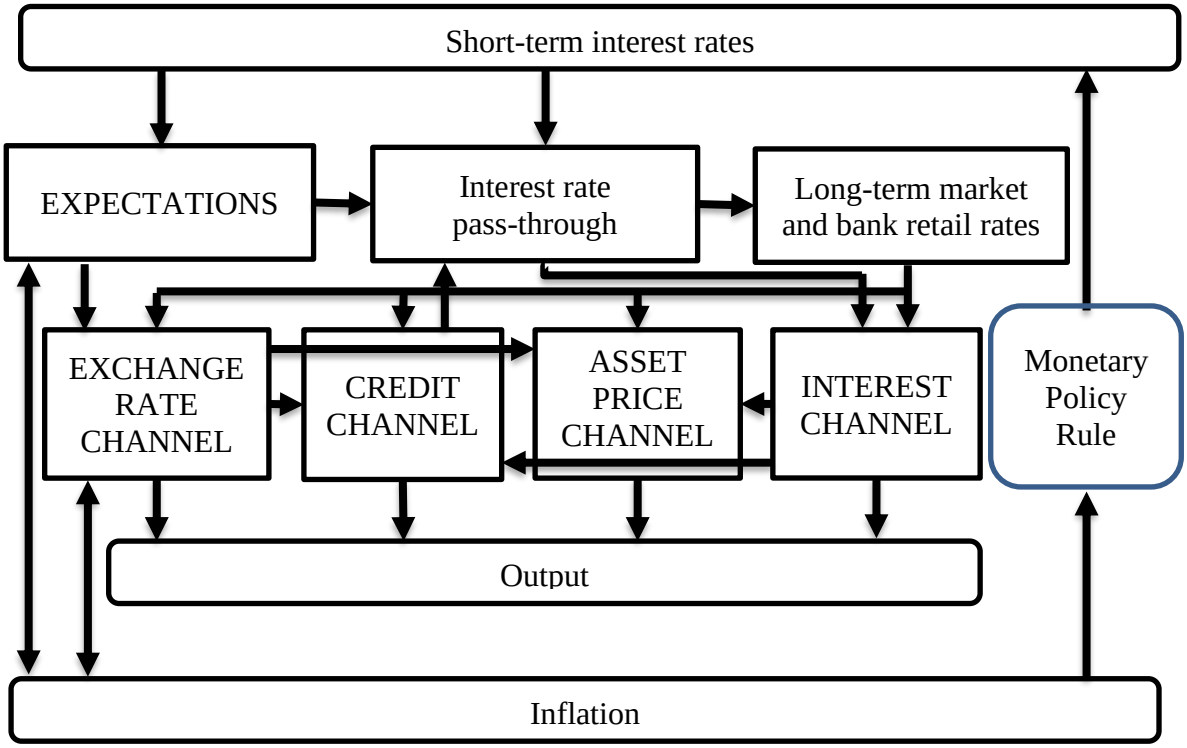

Figure 1.2: The Channels of Transmission Mechanism
(Source: Egert & MacDonald, 2009)

The transmission mechanism provides an explanation on how adjustments in the nominal money supply and nominal interest rate affect macroeconomic variables, i.e. the levels of inflation, output and unemployment (Cambazoglu & Gunes, 2011). As shown in Figure 1.2, the process of the transmission mechanism commences with the conveyance of policy decisions by central banks through adjustments in the short-term interest rates (i.e. money market rates and the treasury bill rate (T-bill)) which are then passed-through to longer-term market rates and bank retail rates. In turn, such decisions will be conveyed to the economy through the aforementioned transmission channels to accomplish monetary policy goals, i.e. price stability, high output levels and full employment.

The dominant transmission channel, which is the most traditional channel among the aforementioned transmission channels, is the interest rate channel. It posits that contractionary monetary policy usually increases real interest rates, and hence decreases the cost of capital or borrowing by economic agents, i.e. households and firms, which then promotes greater investment and consumption demand, and ultimately affects the aggregate output, prices and employment levels (Mohan, 2006a). As consumer spending decisions on housing and consumer durable goods are identical to decisions on investments, this channel is also applicable to consumer spending on residential and consumer durable goods (Song, 2003).

However, Bernanke and Gertler (1995) contended that the traditional interest rate channel only partially explains the whole transmission mechanism which is complex. Due to the this, they proposed the credit channel which serves as an enhancement that intensifies and proliferates the effects of the abovementioned traditional channel. In contrast, this channel transmits the monetary policy decisions by influencing the supply of credit instead